

DERWENT-ACC-NO: 1997-431266

DERWENT-WEEK: 199740

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TITLE: Semi-translucent glass for glass block for building material - comprises sodium sulphate particulate dispersed in oxide(s) of silicon,

aluminium, barium, strontium, zinc, sodium, potassium, sulphur, and molybdenum

INVENTOR-NAME:

PRIORITY-DATA: 1996JP-0023367 (January 16, 1996)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE
PAGES	MAIN-IPC	
JP 09194230 A 006	July 29, 1997 C03C 003/093	N/A

INT-CL (IPC): C03C001/04; C03C003/093 ; C03C004/02 ;
C03C014/00 ; E04C001/42

ABSTRACTED-PUB-NO: JP 09194230A

BASIC-ABSTRACT: Semi-translucent glass has a composition of (by wt.) 50-75% SiO₂, 5-12% Al₂O₃, 0.5-13% B₂O₃, 1-7% BaO+SrO+ZnO, 13-22% Na₂O, K₂O, 0.1-1% SO₃, and 0.05-1% MoO₃, in which Na-sulphate particulate is precipitatedly dispersed, and average transmittance at wave length of 400-700 nm is 10-60% for the thickness of 10 mm.

USE - Used for glass blocks for building materials.

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-194230

(43)Date of publication of application : 29.07.1997

(51)Int.CI. C03C 3/093
C03C 1/04
C03C 4/02
C03C 14/00
E04C 1/42

(21)Application number : 08-023367

(71)Applicant : NIPPON ELECTRIC GLASS CO LTD

(22)Date of filing : 16.01.1996

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(54) OPAL GLASS AND GLASS BLOCK FOR BUILDING MATERIAL PRODUCED FROM THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain opal glass transmitting sunbeams as faint light and excellent in UV shielding ability and chemical durability and to provide a glass block for building material produced from the same.

SOLUTION: This opal glass has a compsn. consisting of, by weight, 50-75% SiO₂, 5-12% Al₂O₃, 0.5-13% B₂O₃, 1-7% BaO+SrO+ZrO, 13-22% Na₂O+K₂O, 0.1-1% SO₃ and 0.05-1% MoO₃, contains fine sodium sulfate particles deposited and dispersed in the glass matrix and has 10-60% average transmissivity in the wavelength region of 400-700nm in the case of 10mm thickness.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

5

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] At a weight percent, it is SiO₂ 50 - 75%, aluminum 2O₃ 5 - 12%, B-2 O₃ 0.5 - 13%, BaO+SrO+ZnO 1 - 7%, Na₂ O+K₂ O 13 - 22%, SO₃ 0.1 - 1%, MoO₃ Milky glass to which it has 0.05 - 1% of composition, a sodium-sulfate particle comes to carry out deposit distribution into glass, and the average permeability in the wavelength of 400-700nm is characterized by being 10 - 60% with the thickness of 10mm.

[Claim 2] At a weight percent, it is SiO₂ 50 - 75%, aluminum 2O₃ 5 - 12%, B-2 O₃ 0.5 - 13%, BaO+SrO+ZnO 1 - 7%, Na₂ O+K₂ O 13 - 22%, SO₃ 0.1 - 1%, MoO₃ Glass block for building materials to which have 0.05 - 1% of composition, and a sodium-sulfate particle comes to carry out deposit distribution into glass, and the average permeability in the wavelength of 400-700nm is produced with the thickness of 10mm from the milky glass which is 10 - 60%, and is characterized by the bird clapper.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the glass block for building materials produced using milky glass and this.

[0002]

[Description of the Prior Art] It is the milky glass which has various composition as milky glass being proposed from before, for example, adding a fluoride at JP,50-40610,A, JP,50-51513,A, JP,53-125418,A, and JP,56-96746,A on the glass of SiO₂-RO-R₂O (R's is, such as Mg, calcium, and Ba, and R's2 is Li, Na, K, etc.). Blooming is indicated.

[0003] Since the crystal of a lot of fluorides deposits in glass, these milky glass has deep opalescence, and it is limited to the use as tableware or accessories.

[0004] Moreover, the development of the glass block for building materials which consists of milky glass is tried, and these people have proposed by JP,63-315534,A in recent years.

[0005] The milky glass currently indicated by JP,63-315534,A has the high permeability of light compared with the milky glass used for tableware, accessories, etc., and is excellent in chemical durability. Therefore, even if it does not have a flash even if the glass block produced from now on receives sunrays, a soft light light will insert it indoors, and it uses it for an outer wall, a veranda, etc. of a building and it is exposed to the acid rain by waterdrop or soot, it produces dimming and does not spoil a fine sight.

[0006]

[Problem(s) to be Solved by the Invention] However, since the glass block for building materials which consists of the above-mentioned milky glass has the large particle diameter of the sodium sulfate which carries out deposit distribution inside glass, it tends to penetrate ultraviolet rays and has the problem of indoor goods fading, and carrying out or being easy to discolor.

[0007] The purpose of this invention aims at offering the glass block for building materials produced from milky glass excellent in the cover capacity and chemical durability of ultraviolet rays, and this milky glass while it makes a soft light light penetrate by carrying out sunrays.

[0008]

[Means for Solving the Problem] The milky glass of this invention is a weight percent, and is SiO₂. 50 - 75%, 2O₃5 - 12% of aluminum, and B-2 O₃ 0.5 - 13%, BaO+SrO+ZnO 1 - 7%, Na₂O+K₂O 13 - 22%, SO₃ 0.1 - 1%, MoO₃ Have 0.05 - 1% of composition, a sodium-sulfate particle comes to carry out deposit distribution into glass, and the average permeability in the wavelength of 400-700nm is characterized by being 10 - 60% with the thickness of 10mm.

[0009] Moreover, the glass block for building materials of this invention is a weight percent, and is SiO₂. 50 - 75%, aluminum 2O₃ 5 - 12%, and B-2 O₃ 0.5 - 13%, BaO+SrO+ZnO 1 - 7%, Na₂O+K₂O 13 - 22%, SO₃ 0.1 - 1%, MoO₃ Have 0.05 - 1% of composition, and a sodium-sulfate particle comes to carry out deposit distribution into glass, and the average permeability in the wavelength of 400-700nm is produced with the thickness of 10mm from the milky glass which is 10 - 60%, and is characterized by the bird clapper.

[0010]

[Function] The milky glass of this invention is SO₃ as Na₂O. Since it deposits after it deposited and this has distributed uniformly the white sodium-sulfate [Na₂SO₄] particle in glass in case both components carry out a vitrification reaction, since it contains so much, sunlight will be penetrated moderately and a light white color tone will be presented.

[0011] Moreover, since the transmitted light can weaken by the diffuse reflection between sodium-sulfate particles, and light-scattering operation when sunlight hits this directly, there is no flash and the peculiar tint of a Japanese style shoji

tone is brewed.

[0012] Next, the reason which limited composition of the milky glass of this invention as mentioned above is explained.

[0013] SiO₂ It is a component used as a glass former, if fewer than 50%, chemical durability will become bad, and when [than 75%] more, the viscosity of glass becomes high and will cause melting difficulty.

[0014] aluminum 2O₃ If fewer than 5%, chemical durability will become bad, if [than 12%] more, the elevated-temperature viscosity of glass will go up and the melting nature of glass will become bad.

[0015] B-2 O₃ although it is the component which has the effect which raises chemical durability while acting as a fusing agent of glass, the effect will not be acquired if fewer than 0.5% -- if [than 13%] more, volatilization will increase from a glass melt front face, and exterior defects, such as a stria and *****, will occur

[0016] Although BaO, SrO, and ZnO are components which raise chemical durability while lowering the viscosity of the glass in a high temperature region, if fewer than 1%, the effect will not be acquired, but if exposed to storm sewage, dimming will occur, appearance will be spoiled, if there are than 7%, glass will devitrify them and it will become difficult to fabricate them. [more]

[0017] Na₂O is a component required while raising the melting nature of glass, in order to deposit the particle of a sodium sulfate in glass. Although K₂O is also the component which raises the melting nature of glass and can be replaced by a part of Na₂O, if there are few these components at **** than 13%, the viscosity of glass will become high and fabrication will become difficult. Moreover, if it increases more than 22%, since chemical durability becomes inferior, it is not desirable.

[0018] SO₃ It will be a component required in order to deposit the particle of a sodium sulfate in glass and to make glass into a frank color, if fewer than 0.1%, the effect will not be acquired, but if [than 1%] more, glass will emulsionize in the shape of a line, and appearance will become inferior.

[0019] MoO₃ If [than 1%] more [it is a moderate size and a component for improving the devitrification inclination of glass while specifically controlling in size of 0.5-100 microns, the effect will not be acquired if fewer than 0.05%, and], glass will emulsionize the sodium-sulfate particle which deposits in glass, and permeability falls.

[0020] Although it is controllable so that the average permeability in the wavelength of 400-700nm becomes 10 - 60% with the thickness of 10mm, since the quantity of light to which this average permeability penetrates glass at less than 10% falls, lighting nature becomes bad, and optical diffusibility will become weak if 60% is exceeded, and homogeneous lighting becomes difficult to get on the other hand, the milky glass of this invention is not desirable.

[0021] Moreover, in this invention, it is possible to make SnO₂, WO₃, P₂O₅, TiO₂, V₂O₅, ZrO₂, MgO, CaO and As₂O₃, Sb₂O₃, a chlorination compound, and a fluoride contain besides the above-mentioned component.

[0022] namely, SnO₂ and WO₃ And P₂O₅ MoO₃ It is the component which has the same operation effect, and it is good to raise the operation which controls especially the size of a sodium-sulfate particle if at least one sort of these components is made to contain 0.05% or more of each. However, if these components increase more than 1% respectively, since glass will emulsionize and permeability will fall, it is not desirable.

[0023] moreover, TiO₂ V₂O₅ What is necessary is for there to be an effect which absorbs ultraviolet rays, and just to make one sort of the component of these, or two sorts contain 0.01% or more of each to heighten the ultraviolet-rays cover capacity of glass further. if these components increase more than 1% of each, in order that [however,] the absorption end may reach to a visible region and the thick portion of glass may color it yellow -- an exterior -- it is not desirable

[0024] Furthermore, it is ZrO₂. What is necessary is for an effect to be to raise the chemical durability of glass, and just to make it contain 0.1% or more to heighten such an effect more. However, ZrO₂ If [than 3%] more, since glass devitrifies, it is not desirable.

[0025] Moreover, although they are a component which has the same operation as BaO etc., if MgO and CaO increase more than 5% respectively, since glass devitrifies them, they are not desirable. As₂O₃, Sb₂O₃, a chlorination compound, and a fluoride are components which act as a clarifier, and it is possible to make it contain to 1%.

[0026] It is possible to also make coloring agents, such as CoO and NiO, contain from the reasons of a design to 1% by this invention furthermore.

[0027]

[Example] Next, this invention is explained in detail based on an example.

[0028] Tables 1 and 2 show the milky glass (sample No.1-8) of this invention, and the milky glass (sample No.9) of the example of comparison. In addition, the glass of sample No.9 is milky glass for glass blocks currently indicated by JP,63-315534,A.

[0029]

[Table 1]

(重量%)

試料No. 組成	実 施 例				
	1	2	3	4	5
SiO ₂	64.60	66.20	61.00	65.70	54.60
Al ₂ O ₃	8.60	8.00	9.50	7.50	10.00
B ₂ O ₃	2.50	1.50	3.00	1.00	7.50
BaO	1.60	2.00	2.50	2.00	2.00
SrO	0.50	0.50	0.50	0.50	0.50
ZnO	2.50	2.00	1.50	3.50	4.00
Na ₂ O	18.10	17.50	18.00	17.30	19.00
K ₂ O	—	—	1.50	0.20	0.10
SO ₃	0.40	0.50	0.30	0.80	0.50
MoO ₃	0.30	0.20	0.10	0.05	0.10
SnO	0.05	0.30	—	0.15	0.15
WO ₃	0.15	—	0.20	0.10	0.05
P ₂ O ₅	0.10	0.10	0.10	—	0.20
TiO ₂	0.10	0.10	0.10	0.20	0.20
V ₂ O ₅	0.10	0.10	0.20	0.20	0.10
ZrO ₃	0.50	1.00	1.50	1.00	1.00
波長400 nmの 透過率 (%)	18.0	10.5	3.7	5.1	16.2
波長400~700 nmの平均透過 率 (%)	30.0	28.0	40.0	26.0	32.0
アルカリ溶出量 (mg)	0.2	0.2	0.2	0.2	0.3

[0030]

[Table 2]

(重量%)

試料No.	実験例			比較例
	6	7	8	
SiO ₂	52.60	68.60	63.05	87.40
Al ₂ O ₃	11.00	8.00	9.50	8.60
B ₂ O ₃	8.50	1.50	3.00	1.10
BaO	2.00	0.50	2.50	1.60
SrO	0.50	—	—	—
ZnO	4.50	2.00	1.50	2.40
Na ₂ O	19.40	17.00	20.00	18.10
K ₂ O	—	1.50	—	—
SO ₃	0.20	0.60	0.30	0.90
MoO ₃	0.20	0.05	0.16	—
SnO	—	0.05	—	—
WO ₃	0.10	—	—	—
P ₂ O ₅	0.20	—	—	—
TiO ₂	0.20	0.30	—	—
V ₂ O ₅	0.10	—	—	—
ZrO ₂	0.50	—	—	—
波長400nmの透過率 (%)	19.3	18.0	21.2	55.3
波長400~700nmの平均透過率 (%)	55.2	42.6	51.6	80.0
アルカリ溶出量 (mg)	0.3	0.2	0.3	0.3

[0031] Each sample of Tables 1 and 2 was prepared as follows.

[0032] The raw materials for glass was prepared so that it might become composition of front Naka first, this was put into the platinum crucible, after depositing the white particle of a sodium sulfate uniformly by carrying out a temperature reduction to 1200 degrees C after fusing at 1450 degrees C with an electric melting furnace for 4 hours, it was beginning to pass on the carbon board, the plate with a thickness of 20mm was fabricated, and, subsequently to a lehr, this was put in and annealed.

[0033] Permeability with a wavelength of 400nm is 21.2% or less, and each sample of No.1-8 which are this invention article was excellent in ultraviolet-rays cover capacity so that clearly from a table. Average permeability with a wavelength of 400-700nm was 26.0 - 55.0%, and moreover, an alkali elution volume is 0.3mg or less, and was excellent also in chemical durability.

[0034] Although average permeability with a wavelength of 400-700nm is 60.0% to it and the sample of No.9 was excellent also in chemical durability, its permeability with a wavelength of 400nm was as high as 55.3%, and it was inferior to ultraviolet-rays cover capacity.

[0035] Moreover, when the particle which deposited in each sample of 9 as No.8 was observed under the microscope, the diameter of the particle which deposited in the sample of No.9 to having been 0.5-70 microns had the diameter of the particle which deposited in the sample of No.8 as large as 50-800 microns.

[0036] Furthermore, produce the glass block of the size of 145x145x95 from each sample of 9 as No.8, and sunlight should let a glass block pass. Although goods according [the glass block produced from the sample of No.8] to ultraviolet rays faded and ***** was not accepted at all when the exposure test (addition 500 hours) irradiated by goods (red, blue, green, yellow, purple color-pigment printing paper) was performed, in the case of the glass block produced from the sample of No.9, goods faded slightly.

[0037] In addition, after permeability with a wavelength [of front Naka] of 400nm carries out optical polish of both sides of each sample glass until it becomes the thickness of 10mm, it measures permeability with a wavelength of

400nm with the spectrophotometer with a large-sized integrating sphere of 150phi.

[0038] Moreover, average permeability with a wavelength of 400-700nm is the same conditions as the above, measures the permeability of 400-700nm of each sample glass for every nm, and calculates the average.

[0039] Moreover, an alkali elution volume is JIS. In order to measure based on R-3502 and to prevent dimming of a glass block, this value is wanted to be 0.5mg or less.

[0040]

[Effect of the Invention] As mentioned above, the average permeability in the wavelength of 400-700nm is 10 - 60%, the milky glass of this invention has the uniform particle diameter of the sodium sulfate which moreover deposits glass, since it is fine, if sunrays are received, a soft light light will insert indoors the glass block for building materials produced from this milky glass, and it is excellent also in the capacity which covers ultraviolet rays.

[0041] Furthermore, since the milky glass of this invention is excellent also in chemical durability, even if it uses the glass block produced from now on for the outer wall and veranda of a building, it does not produce dimming.

[Translation done.]

(19)日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11)特許出願公開番号

特開平9-194230

(43)公開日 平成9年(1997)7月29日

(51)Int.Cl. ⁶	識別記号	序内整理番号	F I	技術表示箇所
C 03 C	3/093		C 03 C	3/093
	1/04			1/04
	4/02			4/02
	14/00			14/00
E 04 C	1/42		E 04 C	1/42 A
				審査請求 未請求 請求項の数2 FD (全6頁)

(21)出願番号

特願平8-23367

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(22)出願日

平成8年(1996)1月16日

(54)【発明の名称】 乳白ガラス及びこれから作製された建材用ガラスブロック

(57)【要約】

【課題】 太陽光線を柔らかな淡い光にして透過させると共に、紫外線の遮蔽能力と化学的耐久性に優れた乳白ガラス及びこの乳白ガラスから作製された建材用ガラスブロックを提供することを目的とする。

【解決手段】 本発明の乳白ガラスは、重量百分率で、
 SiO_2 50~75%、 Al_2O_3 5~12%、 B_2O_3 0.5~13%、 $\text{BaO} + \text{SrO} + \text{ZnO}$ 1~7%、 $\text{Na}_2\text{O} + \text{K}_2\text{O}$ 13~22%、 SO_3 0.1~1%、 MoO_3 0.05~1%の組成を有し、ガラス中に硫酸ナトリウム微粒子が析出分散してなり、波長400~700nmにおける平均透過率が、肉厚10mmで10~60%であることを特徴とする。

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【特許請求の範囲】

【請求項1】 重量百分率で、 SiO_2 50~75 %、 Al_2O_3 5~12%、 B_2O_3 0.5~13 %、 $\text{BaO}+\text{SrO}+\text{ZnO}$ 1~7%、 $\text{Na}_2\text{O}+\text{K}_2\text{O}$ 13~22%、 SO_3 0.1~1%、 MoO_3 0.05~1%の組成を有し、ガラス中に硫酸ナトリウム微粒子が析出分散してなり、波長400~700 nmにおける平均透過率が、肉厚10 mmで10~60%であることを特徴とする乳白ガラス。

【請求項2】 重量百分率で、 SiO_2 50~75 %、 Al_2O_3 5~12%、 B_2O_3 0.5~13 %、 $\text{BaO}+\text{SrO}+\text{ZnO}$ 1~7%、 $\text{Na}_2\text{O}+\text{K}_2\text{O}$ 13~22%、 SO_3 0.1~1%、 MoO_3 0.05~1%の組成を有し、ガラス中に硫酸ナトリウム微粒子が析出分散してなり、波長400~700 nmにおける平均透過率が、肉厚10 mmで10~60%である乳白ガラスから作製されてなることを特徴とする建材用ガラスブロック。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、乳白ガラス及びこれを用いて作製した建材用ガラスブロックに関するものである。

【0002】

【従来の技術】従来より乳白ガラスとしては、種々の組成を有する乳白ガラスが提案されており、例えば特開昭50-40610号公報、特開昭50-51513号公報、特開昭53-125418号公報、特開昭56-96746号公報には、 $\text{SiO}_2-\text{R}-\text{R}_2\text{O}$ (R は、 Mg 、 Ca 、 Ba 等、 R_2O は、 Li 、 Na 、 K 等) のガラスに、弗化物を添加することによって乳白化することが開示されている。

【0003】これらの乳白ガラスは、ガラス中に多量の弗化物の結晶が析出するため、乳白色が濃く、食器や装飾品としての用途に限定されている。

【0004】また近年、乳白ガラスからなる建材用ガラスブロックの開発が試みられ、本出願人は、特開昭63-315534号で提案している。

【0005】特開昭63-315534号に開示されている乳白ガラスは、食器や装飾品等に用いられる乳白ガラスに比べて光の透過率が高く、また化学的耐久性に優れている。そのためこれから作製されたガラスブロックは、太陽光線を受けてもギラツキがなく、柔らかな淡い光が室内に差し込むことになり、また建物の外壁やベランダ等に用いて水滴や煤煙による酸性雨に晒されても、白やけを生じて美観を損なうことがない。

【0006】

【発明が解決しようとする課題】しかしながら上記した乳白ガラスからなる建材用ガラスブロックは、ガラス内部に析出分散する硫酸ナトリウムの粒子径が大きいた

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め、紫外線を透過しやすく、室内の物品が色褪せしたり、変色しやすいという問題を有している。

【0007】本発明の目的は、太陽光線を柔らかな淡い光にして透過させると共に、紫外線の遮蔽能力と化学的耐久性に優れた乳白ガラス及びこの乳白ガラスから作製された建材用ガラスブロックを提供することを目的とする。

【0008】

【課題を解決するための手段】本発明の乳白ガラスは、10 重量百分率で、 SiO_2 50~75 %、 Al_2O_3 5~12%、 B_2O_3 0.5~13 %、 $\text{BaO}+\text{SrO}+\text{ZnO}$ 1~7%、 $\text{Na}_2\text{O}+\text{K}_2\text{O}$ 13~22 %、 SO_3 0.1~1%、 MoO_3 0.05~1%の組成を有し、ガラス中に硫酸ナトリウム微粒子が析出分散してなり、波長400~700 nmにおける平均透過率が、肉厚10 mmで10~60%であることを特徴とする。

【0009】また本発明の建材用ガラスブロックは、重量百分率で、 SiO_2 50~75 %、 Al_2O_3 5~12%、 B_2O_3 0.5~13 %、 $\text{BaO}+\text{SrO}+\text{ZnO}$ 1~7%、 $\text{Na}_2\text{O}+\text{K}_2\text{O}$ 13~22 %、 SO_3 0.1~1%、 MoO_3 0.05~1%の組成を有し、ガラス中に硫酸ナトリウム微粒子が析出分散してなり、波長400~700 nmにおける平均透過率が、肉厚10 mmで10~60%である乳白ガラスから作製されてなることを特徴とする。

【0010】

【作用】本発明の乳白ガラスは、 Na_2O と SO_3 を多量に含有するため、両成分がガラス化反応する際に白色の硫酸ナトリウム [Na_2SO_4] 微粒子を析出し、これがガラス中に均一に分散した状態で析出するため、太陽光を適度に透過し、淡い白色の色調を呈することになる。

【0011】またこれに直接、太陽光が当たる場合にも、硫酸ナトリウム微粒子間での拡散反射、光散乱作用によって透過光が弱められるため、ギラツキが無く、和風障子調の独特的色合いを醸し出す。

【0012】次に本発明の乳白ガラスの組成を上記のように限定した理由を説明する。

40 【0013】 SiO_2 は、ガラスフォーマーとなる成分であり、50%より少ないと、化学的耐久性が悪くなり、75%より多いと、ガラスの粘性が高くなり、溶融困難を招くことになる。

【0014】 Al_2O_3 が、5%より少ないと、化学的耐久性が悪くなり、12%より多いと、ガラスの高温粘性が上昇してガラスの溶融性が悪くなる。

【0015】 B_2O_3 は、ガラスの融剤として作用すると共に、化学的耐久性を向上させる効果を有する成分であるが、0.5%より少ないと、その効果が得られず、50 13%より多いと、ガラス融液表面から揮発が多くな

り、脈理や色綺等の外観上の欠陥が発生する。

【0016】BaO、SrO及びZnOは、高温度域におけるガラスの粘度を下げると共に、化学的耐久性を向上させる成分であるが、1%より少ないと、その効果が得られず、雨水に晒されると白やけが起きて外観が損なわれ、7%より多いと、ガラスが失透して成形が困難となる。

【0017】Na₂Oは、ガラスの溶融性を向上させると共にガラス中に硫酸ナトリウムの微粒子を析出させるために必要な成分である。K₂Oも、ガラスの溶融性を向上させる成分であり、Na₂Oの一部と置換することができるが、これらの成分が含量で13%より少ないと、ガラスの粘度が高くなり、成形が困難となる。また22%より多くなると、化学的耐久性が劣悪となるため好ましくない。

【0018】SO₃は、ガラス中に硫酸ナトリウムの微粒子を析出させてガラスを淡白色にさせるために必要な成分であり、0.1%より少ないと、その効果が得られず、1%より多いと、ガラスが筋状に乳濁して外観が劣悪となる。

【0019】MoO₃は、ガラス中に析出する硫酸ナトリウム微粒子を適度の大きさ、具体的には0.5~1.0ミクロンの大きさに制御すると共にガラスの失透傾向を改善するための成分であり、0.05%より少ないと、その効果が得られず、1%より多いと、ガラスが乳濁して透過率が低下する。

【0020】本発明の乳白ガラスは、波長400~700nmにおける平均透過率が肉厚10mmで10~60%となるように制御することができるが、この平均透過率が10%未満では、ガラスを透過する光量が低下して採光性が悪くなり、一方、60%を越えると、光拡散性が弱くなり、均質な採光が得難くなるため好ましくない。

【0021】また本発明においては、上記成分以外にも、SnO₂、WO₃、P₂O₅、TiO₂、V₂O₅、ZrO₂、MgO、CaO、As₂O₃、Sb₂O₃、塩化化合物、弗化物を含有させることが可能である。

5

6
(重量%)

試料No. 組成	実施例				
	1	2	3	4	5
SiO ₂	64.60	56.20	61.00	65.70	54.60
Al ₂ O ₃	8.60	8.00	9.50	7.50	10.00
B ₂ O ₃	2.50	1.50	3.00	1.00	7.50
BaO	1.60	2.00	2.50	2.00	2.00
SrO	0.50	0.50	0.60	0.50	0.50
ZnO	2.50	2.00	1.50	3.50	4.00
Na ₂ O	18.10	17.50	18.00	17.30	19.00
K ₂ O	—	—	1.60	0.20	0.10
SO ₃	0.40	0.50	0.30	0.60	0.50
MoO ₃	0.30	0.20	0.10	0.05	0.10
SnO	0.05	0.30	—	0.15	0.15
WO ₃	0.15	—	0.20	0.10	0.05
P ₂ O ₅	0.10	0.10	0.10	—	0.20
TiO ₂	0.10	0.10	0.10	0.20	0.20
V ₂ O ₅	0.10	0.10	0.20	0.20	0.10
ZrO ₃	0.50	1.00	1.60	1.00	1.00
波長400nmの 透過率 (%)	18.0	10.5	3.7	5.1	16.2
波長400~700 nmの平均透過 率 (%)	30.0	28.0	40.0	25.0	32.0
アルカリ溶出量 (mg)	0.2	0.2	0.2	0.2	0.3

【0030】

* * 【表2】

(重量%)

試料No. 組成	実 験 例			比較例 9
	6	7	8	
SiO ₂	52.00	68.60	63.05	67.40
Al ₂ O ₃	11.00	8.00	9.50	8.60
B ₂ O ₃	8.50	1.50	3.00	1.10
BaO	2.00	0.50	2.50	1.50
SrO	0.50	—	—	—
ZnO	4.50	2.00	1.50	2.40
Na ₂ O	19.40	17.00	20.00	18.10
K ₂ O	—	1.50	—	—
SO ₃	0.20	0.50	0.30	0.80
MoO ₃	0.20	0.05	0.15	—
SnO	—	0.05	—	—
WO ₃	0.10	—	—	—
P ₂ O ₅	0.20	—	—	—
TiO ₂	0.20	0.30	—	—
V ₂ O ₅	0.10	—	—	—
ZrO ₂	0.50	—	—	—
波長400nmの 透過率 (%)	19.3	18.0	21.2	55.3
波長400~700 nmの平均透過 率 (%)	55.2	42.6	51.6	80.0
アルカリ溶出量 (mg)	0.3	0.2	0.3	0.3

【0031】表1、2の各試料は、次のようにして調製した。

【0032】まず表中の組成になるようにガラス原料を調合し、これを白金ルツボに入れ、電気溶融炉で1450°Cで、4時間溶融した後、1200°Cまで温度降下することによって硫酸ナトリウムの白色微粒子を均一に析出させた後、カーボン板上に流し出して肉厚20mmの板状体を成形し、次いでこれを徐冷炉に入れて徐冷した。

【0033】表から明らかなように、本発明品であるN_{o.} 1~8の各試料は、波長400nmの透過率が2

1. 2%以下であり、紫外線遮蔽能力に優れていた。また波長400~700nmの平均透過率が26. 0~55. 0%であり、しかもアルカリ溶出量が、0. 3mg以下であり、化学的耐久性にも優れていた。

【0034】それに対し、N_{o.} 9の試料は、波長400~700nmの平均透過率が60. 0%であり、また化学的耐久性にも優れていたが、波長400nmの透過率が55. 3%と高く、紫外線遮蔽能力に劣っていた。

【0035】またN_{o.} 8と9の各試料に析出した微粒子を顕微鏡で観察したところ、N_{o.} 8の試料に析出した微粒子の直径が、0. 5~70ミクロンであったのに*

50 *に対し、N_{o.} 9の試料に析出した微粒子の直径は、50~800ミクロンと大きかった。

【0036】さらにN_{o.} 8と9の各試料から145×145×95の大きさのガラスブロックを作製し、太陽光がガラスブロックを通して物品（赤、青、緑、黄、紫色着色顔料印刷紙）に照射される暴露試験（積算500時間）を行ったところ、N_{o.} 8の試料から作製されたガラスブロックは、紫外線による物品の色褪せや変色は全く認められなかったが、N_{o.} 9の試料から作製されたガラスブロックの場合は、物品がわずかに色褪せた。

40 【0037】尚、表中の波長400nmの透過率は、各試料ガラスの両面を肉厚10mmになるまで光学研磨した後、150φの大型積分球付き分光光度計で波長400nmの透過率を測定したものである。

【0038】また波長400~700nmの平均透過率は、上記と同様の条件で、各試料ガラスの400~700nmの透過率を1nmごとに測定し、その平均値を求めたものである。

【0039】またアルカリ溶出量は、JIS R-3502に基いて測定したものであり、ガラスブロックの白

やけを防止するためには、この値が0. 5mg以下であ

ることが望まれる。

【0040】

【発明の効果】以上のように本発明の乳白ガラスは、波長400～700nmにおける平均透過率が10～60%であり、しかもガラス内部に析出する硫酸ナトリウムの粒子径が均一で、細かいため、この乳白ガラスから作製された建材用ガラスブロックは、太陽光線を受ける

と、柔らかな淡い光が室内に差し込むことになり、紫外線を遮蔽する能力にも優れている。

【0041】さらに本発明の乳白ガラスは、化学的耐久性にも優れているため、これから作製されたガラスブロックを建物の外壁やベランダに使用しても白やけを生じることがない。